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Observations on the Feeding of Calves and Young Cattle*

WM. C. MILLER, M.R.C.V.S., F.R.S.E.,

PROFESSOR OF ANIMAL HUSBANDRY, ROYAL VETERINARY COLLEGE

Feeding of calves is a particularly difficult subject to consider concisely, partly because foodstuffs, conditions, customs and practices vary so much in different parts of the country, but at present even more so because of the limitation in choice of foods imposed by the war, shortage of skilled labour and so on.

It is not necessary to do more than remind you that owing to a general increase in the demand for milk for human consumption, together with various kinds of war-time restrictions imposed upon the producer, the calf must forfeit much of the normal 50 or 60 gallons or more of whole milk, with which it used to commence its life. This does not make this afternoon's discussion any easier.

I propose to make comments upon management and housing in addition to feeding, since important though feeding is, it is by no means the only factor that must be considered in the rearing of healthy calves, and in the control of such diseases as are capable of being controlled.

Further, as has been pointed out by my colleague, Dr. Lovell, recently in his address at the Sixtieth Annual General Meeting of the N.V.M.A., " No disease has a single cause . . . and the discovery of specific microbic or other agents of disease has a limiting effect upon the vision and practice of many medical men. It has, in fact, compelled a neglect of the associated causal factors and fostered a belief in a single determining cause."

I make no apology for quoting this, for we are no less to blame than those specifically included above—the medical profession. We all know how much we are tempted to trust to an " inoculation against " this or that disease, hoping—often vainly—that the outbreak will decrease in severity, and the client will be satisfied that the inoculation was a good thing. But, in our secret hearts, how often do we wonder whether we have not really wasted time and money and failed to reach the root cause of the trouble.

I propose, therefore, to try to trace from birth to about six months, the life history of the calf, and will touch on many aspects.

I. Calving and the Young Calf

The first principle to urge is that the profession should do all it can to stop the all-too-common practice of allowing cows to calve in the cowshed. In the interests of ordinary hygiene and humanity, calving in the restricted space and far from suitable conditions of the cowshed is so obviously wrong that it hardly needs further comment. I would point out, however, that in these days when wheat straw is so plentiful it takes but little ingenuity and time to construct a perfectly satisfactory calving box by means of straw trusses or bales, built into four walls like bricks, with doorway and windows. The roof is readily made by a waggon cloth or other tarpaulin stretched across a pole to form the ridge, and tied to stakes (thatching) stuck into the bales. The door can be a hurdle, gate, or merely three battens across the doorway. The size can be anything suitable, 16 × 16 feet is a handy size, the " loose-box " can be single or multiple, and the cost is exactly nothing. Provided plenty of clean straw is used as litter, questions of drainage need not arise. If a concrete floor is available, however, so much the better. The same box can be used for several cows; with a little care it will last for a winter or more, or where necessary and desirable a new one can be built for each cow, *e.g.*, upon an infected farm.

The next point to stress is the very great importance of colostrum for each calf. There is now a much better appreciation than formerly amongst farmers and stock-owners, of the importance of ensuring that calves get fed on colostral milk for at least the first four or five days of life. But there are still stockmen who need educating in this direction. The purely physiological laxative characters, the immunological importance and the protein and vitamin values of colostrum should each be emphasised. The various branches of the Young Farmers' Club movement have done much to popularise an appreciation of the importance of colostrum among the farmers and stockmen of to-morrow.

Regarding frequency of feeding, while I fully realise that in general farming practice it is impossible to imitate natural suckling in respect of the amounts and frequencies of milk feeding I feel strongly that the too common system of feeding calves during the first three or four weeks of their lives on only two feeds daily, of anything up to ½ or ¾ of a gallon of whole milk, should be condemned. We have often advised four (or even five) feeds in the 24 hours at regular intervals (at 7 a.m., 11 a.m., 3 p.m. and 7 or 8 p.m.) of only 1½ to 2 pints of whole milk each, nearly always with great benefit to the calves. I fully appreciate the extra labour involved, but where possible, land girls and even the older children can help greatly. More care in the frequency and amount of the feeds will do much to prevent serious digestive disorders—white scour—etc., which are often due to overburdening the fourth stomach with milk at each feed. I like to see calves fed four times daily until they are three weeks or so old, and then three times until towards the end of pail feeding.

Temperature of the milk or milk-substitute, gruel, etc., is of the greatest importance in the young calf. There is only one correct temperature for all these fluid feeds, and that is *exactly body temperature*. It is now known that milk at body temperature passes to the abomasum, while cold milk goes largely to the rumen, where it decomposes.

Diluting milk with clean warm water or lime water is useful when calves do not take it readily, show diarrhoea with bad-smelling faeces, and " grate " their teeth (a symptom generally ascribed to over-acidity). In Jersey and Guernsey breeds high fat content of the milk may cause some degree of indigestion which is usually amenable to dilution of the milk.

I do not think we are justified in recommending anything but whole fresh milk for calves up to three weeks of age. I am fully aware of the claims made for National Calf Starters, and of the results obtained when the calf is robbed of its natural food; the very least that can be said is that clean fresh new milk is the natural food for the young calf, and we cannot be wrong in advocating it for the rearing of those calves which are to form the dairy cows of to-morrow.

II. Stage 3 or 4 weeks to 2½ to 3 months

This is a critical stage in the life of the calf. The stomachs, hitherto adapted to a fluid diet only, now differentiate in function so that solids can be digested. The fibre-digesting functions of the rumen begin to be established. These involve a series of fundamental changes involving digestive enzymes, bacterial flora, and the physical nature of the ingesta. It is surprising that the importance of these great changes seems to have aroused comparatively little interest among nutritionists and physiologists.

What do we know of the criteria which should govern the feeding and management of calves during this period?

First, the general principles of hygiene should be observed. I do not need to stress the importance of a light, airy, dry and, if possible, sunny calf house. I like to see about 360 square inches (or 2½ square feet) of direct sky lighting or about 900 square inches (or 6 square feet) of wall lighting per head of calf, and at least 600 cubic feet of air space each. There should be fixed inlets on the most sheltered side of the building to give at least 4 square inches of inlet ventilation at about 1 foot above floor level, with the same amount of outlet at the ridge. These amounts are more generous perhaps than are recommended elsewhere, but most authorities are to my mind too conservative in respect of both light and air where calf houses are concerned.

Bedding gives rise to some controversy among different people: some advocate sawdust or peat moss litter and condemn straws because they say calves will eat coarse straw which they cannot digest. I believe that if calves are able to satisfy their desire for fibre by having access to good quality meadow or mixed rye grass and clover hay, preferably in a net to keep it clean, normal healthy calves will never do themselves any harm by eating straw bedding. Whatever is used, a dry warm bed to sleep on in winter and a cool one in summer are essential. I might mention that some Scottish breeders have a sparred " duck-board " raised on brick piers about 4 to 6 inches above the level of the concrete floor. These false floors are made of oak or elm, and are strongly constructed. They give almost perfect drainage through the bedding, and are warm. Their introduction appears to have had a beneficial effect upon the incidence of white scour in some herds, but as with other measures taken, it is often hard to know which single improvement in general housing and management has most influence upon calf diseases and disorders.

An impervious floor is essential. Nothing has yet replaced good smooth cement concrete, provided with air-insulation and falls of about 1 in 40 to surface drains leading to a gulley-trap outside the

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building. Various proprietary substances, bitumen compounds, and so on, have their advocates, but most of them are more expensive than concrete. None of the brick, cobbled, rammed earth, chalk or clay floors, which in some parts are common, can be properly disinfected, nor do they dry out when the muck is removed. Good smooth cement concrete is perfectly satisfactory if it is laid with air spaces in it, not more than 2 inches below the surface (plan-tubes, 2-inch field drain pipes, hollow tiles, etc.) to act as insulators from ground cold and damp, and is kept well covered by a good bedding of straw. Peat moss litter can be used in a layer under the straw if desired to absorb urine. [The conservation of urine from farm animal houses is always desirable; in war-time, with restriction in supplies of potash and phosphates, it is imperative. More liquid manure tanks should be installed and used on farms in the south of England. Disinfectants, water used for washing, and so on can easily be by-passed into the storm-drains to prevent dilution of the liquid manure.]

The feeding principles that should be observed fall into several categories: (i) to supply the necessary fibre in the most nutritious and readily digestible form; (ii) to replace the milk feeding slowly by other liquid foods including clean water; (iii) to ensure the adequacy in starch and protein intakes of the whole of the calves' daily ration; and (iv) to ensure that the necessary minerals and vitamins are available in the food. Each of these is considered separately.

(i) *The Fibre.*—Any kind of hay will not give good results with young calves. It should be for preference of the soft meadow-hay type, with plenty of leaf, as green as possible, and with a fair content of leguminous plant—wild white clover, perennial red or white clover, trefoils, etc. If such meadow hay is available which has been cut early before it is "ripe," so much the better. On the best farms, suitable meadows are cut early in the season and a quantity of the very best hay is reserved for calf-feeding and stacked separately from the rest.

Dried young grass—first cut—is also excellent for calves, but it is not made extensively in the country under war-time conditions.

Coarse, hard, late cut hays with much rye grass, cocksfoot, broad red clover, or lucerne are generally speaking undesirable for young calves, though they are suitable for calves of three or four months old or more.

The use of a hay-net in preference to a hay-rack for young calves is worth emphasising. The hay-net allows the young calf to pull out what it requires, without risk of injury, can be hung at different levels for calves of different ages, and can be placed where most convenient. Hay-racks form undesirable projections in the pens with which a calf will sooner or later collide when jumping about—as calves nearly always do.

Fibre intake is also supplied by some of the ingredients of the concentrates, fed as trough mixtures. The fibre best tolerated by the young calf is probably that in crushed oats. The fibre in the husk of linseed—either in finely ground linseed cake, or in whole linseeds after softening in gruels and calf-meals—is also well digested, but the fibre of both cortex and lint in all the cottonseed products is not well tolerated by calves. Bean husk fibre is not well digested unless ground very fine or steeped. It is good and safe advice to prohibit the use of cottonseed by-products rich in fibre for all young cattle under six months of age. Bran is good in small amounts, but when large amounts are fed dry, it tends to cause constipation. Crushed or cracked barley is useful, but is perhaps rather too fattening except in restricted amounts.

(ii) *Replacement of Whole Milk.*—It is essential to effect the change from whole milk to other foods gradually. The method being advocated during war is to feed whole milk at the average rate of about ¾ to 1 gallon daily for the first ten days. The colostrum is of course included. From the 10th to the 14th day, one-quarter of the milk is substituted by gruel or "calf-starter." This latter is based upon dried whey and linseed cake meal, and contains finely ground soya bean meal, cereal meals and other substances, adjusted to form a balanced food. It is made into a gruel by simmering with hot water. From the 14th to about the 18th day, one-half of the whole milk is substituted by "starter," from the 18th to the 22nd day three-quarters of the milk is replaced, and very soon after only starter-gruel is used. This is continued until about two months of age, and then is reduced until, at ten or eleven weeks, liquid feeding is discontinued.

By this method only 15 to 18 or 20 gallons of whole milk is allowed per calf, and there are those who claim that they only allow 10 or 12 gallons of whole milk for each calf. The saving in milk is obvious, but one wonders how far the policy of robbing the calves to this extent will have serious repercussions upon future dairy herds formed from calves reared in this way: we may well come to call them "war-time calves."

From a nutritional point of view, it is undoubtedly by far the better policy to continue whole milk feeding until the calves are three to four weeks old, and then to commence gruel feeding. In special herds (high-yielding or pedigree) it is, even in war-time, a good rule to continue whole milk until calves are a month old, then from four to five weeks to substitute a quarter of the whole milk by a gruel mixture; at five to six weeks, half; six to seven weeks, three-quarters; and at seven to eight weeks the milk is stopped, and gruel feeding, calf-meals, etc., are continued from then until about three months of age. This makes it easy to explain to the herdsman: *viz.*, whole milk the first month; substitution the second month, and gruels the third month.

Regarding gruels, the choice will be conditioned by what foods are available—especially what home-grown foods, whether good facilities exist for proper simmering to make a real gruel, whether only short period boiling or steaming can be done, or whether only hot water is available so that a true gruel cannot be made but only a hot "emulsion" or suspension of the foods without any cooking. Whether any skim milk, whey or whey products, can be obtained will also make a difference. Then there are those who consider that dry meal feeding is satisfactory.

One cannot attempt to describe all conditions. It might be usefu to consider some of the commonly used mixtures and compare their nutritive values with each other, noting any special points about them. The following is a fairly representative collection from sundry sources. Nearly all are made from foodstuffs which are available in war-time, and it might perhaps be mentioned that for all practical purposes Sussex-ground oats, oatmeal, fine ground barley and fine weatings can replace each other in calf-meals. They are of course not exactly equivalent, but where one is not available one of the others can be made to serve the purpose.

Personally, I think better results in growth and development result from the inclusion of bean meal in calf-meal mixtures, but pea meal is almost equally useful. The proteins of these legumes contain a better range of amino-acids, and their biological value is of course higher than in linseed or the cereals.

Calf-meal Mixtures: Proportions by Weight of each Ingredient	Lb. of Starch Equivalent per lb. of Mixture	Lb. of Protein Equivalent per lb. of Mixture	Weekly Intakes at the Rate of 2 lb. per Head per Day		Comments
			Starch Equivalent lb.	Protein Equivalent lb.	
1. Oatmeal .. .. 8 Ground linseeds 1 9	0·81	0·09	11·34	1·26	Separated milk to be added. 5 pints to 2¼ lb.
2. Linseed cake meal 2 Oatmeal .. .. 2 Ground linseeds 1 5	0·79	0·225	10·06	3·15	Water added: 1 lb. per gal.
3. Linseed cake meal 14 Ground linseeds 5 Wheat flour .. 2 Locust bean meal 2 23	0·85	0·20	11·90	2·80	Water added: 1 lb. per gal.
4. Ground linseeds 1 Ground malt .. 3 Pea meal .. 6 10	0·84	0·11	11·76	1·54	Water added: 1 lb. per gal.
5. Sussex ground oats 2 Fine ground barley meal .. 2 Pea meal .. 2 Ground linseeds 1 7	0·75	0·122	10·5	1·71	Water added: 1 lb. per gal.
6. Linseed cake meal 3 Bean meal (sifted) 3 Fish meal .. 1 7	0·70	0·27	9·8	3·78	Whey added: 1 lb. to 1 gal.
7. Linseed cake meal 1 Weatings .. 1 2	0·78	0·16	10·92	2·24	Whey added: 1 lb. to 1 gal.
8. Bean meal .. 5 Linseed cake meal 4 9	0·71	0·22	9·94	3·08	Whey added: 1 lb. to 1 gal.

I have added the weekly amounts of starch and protein equivalents which the calves, fed on each at the rate of 2 lb. daily, would get. There are variations in starch equivalent from 9·8 to 11·90 lb., and in protein from 1·26 to 3·78 lb.—which is three times more [in No. 6 than in No. 1]. The point to emphasise is that each of these mixtures will serve to replace milk successfully, but it is necessary to adjust the amount fed carefully in accordance with the size and age of the calf and its appetite. It is useless to try to feed calves strictly to a set formula. Each must be studied individually and suitable minor but important adjustments made in the amounts offered.

It will be seen also that linseed or linseed cake meal figures in each of these milk-substitute mixtures. There is no doubt that linseed is an especially valuable food for calves. It is demulcent, laxative, easily digested, and readily eaten by all normal calves. Moreover, it is now being grown in Britain in increasing quantities—which should ensure supplies for the future. One important point is worth stressing. There have been numerous calves poisoned by HCN generated from linseed or linseed cake meal gruels prepared wrongly.

I would remind you that moisture and warmth are necessary to activate the enzyme (linase) which breaks up the cyanogenetic glucoside (linamarin) into acetone, sugar, and HCN. The enzyme is destroyed by boiling for ten minutes, but the linamarin is not. Consequently, all gruels which contain linseed, extracted linseed meal, or linseed cake meal, should be *vigorously boiled for ten minutes* at some stage in the cooking process. I have seen it recommended that soaking calf-meal mixtures containing linseed, over night (or worse still for 48 hours) and warming to body heat, will dispense with proper cooking. It would be difficult to devise a better way to ensure that the mixture contained a poisonous amount of HCN!

Water. It is essential to provide adequate, clean fresh water supplies, twice daily, in buckets which can be removed and cleansed. Fixed troughs are not good, as they cannot be readily disinfected. Bucket rings outside the pens are best, since they are not then subject to fouling from faeces. They should be about 18 inches high. Various workers have concluded that it is necessary to supply calves with from 3 to 4½ lb. of water for every 1 lb. of dry matter taken in. During the first month of life, this means that a calf will drink about ½ gallon daily, increasing to 1 gallon at two months. Warmed water in very cold frosty weather is an advantage.

(iii) *Adequacy of the Whole Ration.*—It has been noted that it is not possible to feed calves exactly according to a daily standard table of requirements. It is easy to devise a theoretically ideal standard, but in practice there must be a considerable latitude allowed. You cannot feed calves by arithmetic only, they need individual consideration.

From the age of three to three and a half weeks, healthy normal calves will usually begin to show a desire for solid food, and dry feeding must be started. The small amounts taken up to five or six weeks of age should be regarded only as an introduction of solid food and not as supplying any appreciable amount of food nutrients. When the digestive functions have changed, the dry food assumes an increasing importance in the rations, until the calves, at about three months (or less) are able to live entirely on dry foods and water. The changes involve increase in size, capacity and functioning of the rumen—hitherto small and practically inert—and the establishment of cellulose digestion by means of protozoa and bacteria. The guiding principle should be the gradual introduction, first of the softer kinds of fibre which are least lignified, later of a somewhat coarser fibre with more lignin. One of the common faults is to use a type of fibre which is too coarse and indigestible, or to give too little good hay which fails to satisfy the calf's desire for fibre and causes it to eat its bedding—straw, etc. In this connection, sheaves of oats at harvest time are not suitable for calves under four or five months of age; their non-protein nitrogen content is liable to be considerable, and the mature straw is too coarse.

Regarding dry trough fed mixtures, there is almost as big a variety as among calf-meal mixtures. At about one month old, 2 to 4 oz. only (a handful or so) of the dry food should be given. The common method of putting this at the bottom of the pail when the calf has finished all but the last pint or so of milk, gruel, or milk substitute, is a good one, but it may also be left in the troughs for the calves to find for themselves.

It is not until the calf is six to eight weeks old that the dry concentrate mixture begins to become of importance in the ration. It should then be getting 6 to 8 oz. per day (or more if liquid gruels are scarce).

The composition of dry "cake" mixtures varies, but coarse oatmeal, crushed oats, flaked maize, and linseed cake or cake meal, were more commonly used than other foods in normal times. At present, flaked maize is not available. Innumerable compound cakes, calf nuts, and other proprietary mixtures are, or have been, on the market. Some of these are good and have stood the test of time; some are very doubtful; and some are definitely fraudulent mixtures, which are not worth the prices charged for them.

It might be as well to mention something of the fundamental principles upon which the dry concentrates should be based. Various experiments have shown that calves given free choice of many different foods will, from the age of about a month or six weeks onwards, choose those which have a fairly high protein content. Apart from obvious reasons, the importance of a right choice of foods is that synthetic creation of water soluble vitamins occurs in the rumen, and in addition to the cellulose digesting mechanism referred to earlier, the ruminal infusoria and bacteria play an important part in the resynthesis of the proteins on which the calf is nourished. Schwarz (1925) estimated that in the rumen about 20 per cent. of all the nitrogen present is in the form of protozoon organisms, and 10 per cent. in the form of bacteria. These organisms live and multiply on the foodstuffs taken in; they produce proteins and other by-products which are later absorbed by the system and their own dead bodies yield further protein substances which are assimilated by the ruminant's system.

It seems that one of the important functions of the sugars and proteins of the food is to feed these microörganisms, which are best regarded as an intermediate stage in food assimilation.

It is known also that comparatively simple substances, such as salts of NH_3, urea, and some amides, can be converted into body tissue and the organisms play a part in changing these simple into more complex substances. Consequently it is necessary to feed the bacterial flora and the protozoal fauna of the rumen, as well as to feed the calf.

It is feared that at the present time there is but little direct scientific evidence of the various food substances which are best suited to the needs of the flora and fauna of the rumen, and therefore to the needs of the young calf, but there is a considerable mass of accumulated experimental evidence which cannot be disregarded.

To illustrate what mixtures are in use, the following tables are given and compared with each other:—

		Lb. of S.E. per lb. of Mixture.	Lb. of P.E. per lb. of Mixture.
1.			
Linseed cake	3		
Crushed oats	4		
Maize meal	2		
White fish meal	1	0·72	0·17
	10		
2.			
Linseed cake	8		
Crushed oats	4		
Flaked maize	4		
Middlings (coarse)	3		
White fish meal	1	0·72	0·18
	20		
3.			
Linseed cake	4		
Crushed oats	3		
Barley meal	2		
Fish meal ..	1	0·67	0·19
	10		
4.			
Linseed cake	6		
Crushed oats (or barley)	5		
Flaked maize	4		
Bean meal ..	4		
Fish meal ..	1	0·70	0·18
	20		
5.			
Maize meal	21		
Wheat meal	22		
Oats (ground)	15		
Linseed meal	15		
Ground malt barley ..	10		
Dried skim milk ..	12		
Blood meal ..	3		
Bone meal ..	1		
Common salt	1	0·79	0·15
	100		

		Lb. of S.E. per lb. of Mixture.	Lb. of P.E. per lb. of Mixture.
6.			
Maize meal	40		
Dried lucerne meal ..	20		
Bran (med.)	20		
Linseed meal	20	0·71	0·11
	100		
7.			
Maize meal	2		
Middlings (coarse)	4		
Oat groats ..	2		
Linseed meal	1		
Blood meal ..	¼		
Bone meal ..	¼		
Common salt	¼	0·72	0·14
	10		
8.			
Crushed oats	2		
Bran ..	2		
Maize meal ..	2		
Dried skim milk ..	2		
Linseed meal	1		
Common salt	2	0·70	0·15
	11		
9.			
Maize meal	25		
Crushed wheat	25		
Malted barley	25		
Linseed meal	12		
Blood meal	12		
Common salt	1	0·92	0·16
	100		
10.			
Flaked maize	30		
Crushed oats	30		
Bran ..	30		
Crushed soya beans ..	10	0·64	0·12
	100		

It will be noted that the first four are rather richer in protein than the others, but the fact that calves have been reared successfully on each of these mixtures indicates the wide choice there is in trough concentrate mixtures. During war not all the foods mentioned are readily available, but it is still possible by substituting foods of

similar characters to get a useful concentrate under most conditions at present.

Obviously the quantity of each fed will vary according to circumstances. Where a full gruel mixture or whole milk is given, only small amounts will be needed, but at two and a half to three months of age calves can take up to 2 or 3 lb. daily. The old rule of 1 lb. per month of age is not wrong if a good mixture is used. The most important fact to ensure is that amounts shall be increased quite slowly, and if any is left uneaten, or if any slight digestive disturbance should arise, the amount must be reduced. It is a good plan to feed to below the appetite, and if good hay is available 1½ lb. may be quite enough to fulfil the needs at eight weeks of age.

I think it is perhaps worth mentioning that now when fish meal is very hard to buy, meat and bone meal, "sea meal," good quality blood and bone meal (in the proportions of one part of bone meal to three or four of blood meal), can be used instead. The mineral content of these types of foodstuffs will supply practically all the minerals which calves require if fed at about 10 to 12 per cent. of the concentrates.

(iv) *Minerals and Vitamins.*—Analyses of the entire bodies of calves have been made by Haigh and others (1920). The ash content was found to be 4·6 per cent. in weight. In addition to the usual minerals—Ca, P, Mg, Na, K, Cl, F, I, Fe, Cu and Co—a large number of elements were identified as being present in very small amounts by spectroscopic methods by Rusoff (1941). He lists Al, Ba, B, Cr, Pb, Mn, Mo, Ni, Ag, Sr, Sn, Ti, V, and Zn. The minerals which are worthy of special consideration for indoor-fed calves are Ca, P, Mg, Cl, Na, and perhaps S. The trace elements are only likely to be deficient in areas where the soils are known to be poor in some particular substance. Otherwise, the calves will almost certainly obtain enough trace elements in the foods they consume, and more especially if some green food is fed.

There is a lack of accurate knowledge of what the calf's needs in respect of minerals are, but there are some guiding principles to be noted.

1. Milk does not contain a sufficiency of minerals for normal growth and development.
2. Most meals and gruels made from crushed seeds and their by-products contain enough phosphates but are poor in calcium (and often in magnesium).
3. Good quality hays have adequate supplies of calcium in stems and blades but not in flowering heads.
4. The newly-born calf nearly always obtains from its dam enough Ca, P, and Mg, *in utero*, to enable it to be born with normally calcified bones. (It was pointed out by Theiler and his co-workers (1927) that a calf is never born with rickets. If this condition develops later, it is rather a non-calcification of the newly formed bone tissue than a de-calcification of bone already formed.)
5. Any consideration of minerals only, without equal consideration of vitamin D and sunlight is useless. (The effect of keeping calves in light airy buildings facing south can be emphasised in relation to calcium, phosphorus and magnesium utilisation and consequent good bone growth, as well as upon purely hygienic grounds.)

A lively appreciation of the above points will go a long way towards solving the question of what minerals calves need and when they should be given.

There are two views regarding the feeding of minerals: one is that by feeding a preparation containing natural bone—fish meal, meat and bone meal, or one or another form of bone meal, etc.—no further attention need be paid to minerals as such; the other is that a mixture of minerals in the form of chemical substances—mineral licks, bricks, or compounded mixtures—should be used. Both methods give satisfactory results, provided they are used intelligently. There is a further view: that the calf will obtain all the minerals it needs from its foodstuffs. The latter view is probably correct for those areas where the soil is rich and the crops are good, but on poor, light, sandy or thin land, mineral supplements in one form or another are necessary if the best results are to be obtained from the rearing of calves in both the growth and vigour of the animals themselves and in the healthiness and performance of the adult animals. It is worth noting that many of the more intensively dairying districts are the districts where the soil is light and sandy.

In areas known to be deficient in such trace elements as Fe, Cu and Co, *e.g.*, in the "pining areas," "blown sand" areas, and so on, it is necessary to ensure that these elements are available both to the pregnant cows (for the calf is normally born with a large reserve of Fe and Cu in its liver which must be obtained from the dam), and to the young growing calf. Iodine-deficient areas in other parts of the world present their own problems in the birth of hairless dead, hairless living, or haired but with hyper-plastic thyroid glands, according to the degree of deficiency present. We occasionally encounter hairless living calves in parts of this country remote from the sea and also calves (as well as foals and pups) with enlarged thyroids. The explanation of these isolated cases of iodine deficiency is rather that there has been a failure in an individual cow or heifer to provide or secure enough iodine for her calf's demands, than that iodine administration is necessary for the whole herd. Individual cows which have produced a hairless calf should be given iodine as a supplement at a future pregnancy. A simple solution of KI is sufficient, if it supplies 3 or 4 grains of I daily during pregnancy.

The following amounts of various minerals have been recommended by various workers as being the daily requirements; *i.e.*, the intakes from all sources, not the amounts to be given as supplements. The amounts are the daily quantities averaged from birth up to about six months.

Calcium ..	11 grammes (¾ oz.) at first falling to 5 or 6 grammes at 6 months.	Mitchell and McClure (1937).
Phosphorus	10 grammes.	
Magnesium	25 to 30 mgm. per kilo. live weight.	Johnson, Loosli and Maynard (1940).
Chlorine ..	5 grammes daily or less.	Theiler *et al.* (1927).
Sodium ..	1·5 grammes.	
Iodine ..	Where necessary, as an iodised salt containing 0·02 per cent. of I, fed ¼ to ½ oz. daily.	
Iron ..	400 to 600 mgm. daily	Knoop *et al.* (1935).
Copper ..	40 to 60 mgm. daily	
Cobalt ..	5 to 10 mgm. daily.	Neal and Ahmann (1937).

It is probable that these amounts would need modification to suit different localities, but they are given as a general guide.

We have used a mineral mixture on a farm where a trace element deficiency of unknown identity was suspected among the calves and young stock. There were no facilities for a determination to be made and it was decided to supply a fairly complete trace element mixture. The results cannot yet be stated, but the formula used is given as matter of interest.

Iron oxide ..	1,000 grammes.	Boric ac. ..	1 gramme.
Copper iodide ..	100 "	Nickel sulphate	1 "
Manganese sulphate	2 "	Zinc sulphate	1 "
Cobalt sulphate ..	2 "		

The last six were ground together first, then incorporated with the iron oxide. The mixture was then divided into five equal parts and each was added to 10 lb. of Special Feeding bone meal and very carefully mixed with it. The five separate lots were then mixed together, and it was fed at the rate of ½ oz. per head daily. The mixing had to be done very carefully.

Vitamins in calf-feeding are a study in themselves. I cannot do more than point out some salient facts at present. Previously it was thought that only vitamins A and D were of importance, but it is doubtful whether this is really correct. There are some very interesting facts which have lately come to light regarding vitamins C and E which may cause us to pay more attention to them.

It is useful to summarise the effects which have been recorded in calves deprived of vitamin A and have not been allowed any colostrum, and from cows which have been kept on vitamin A deficient diets during pregnancy.

The work of Hart (1924), Eckles (1924), and Jones, Eckles and Palmer (1926), first showed that calves born from A-deficient cows would suffer from eye lesions, blindness, microphthalmia at birth, and that failure to grow, pneumonia, neuritis, sclerosis of the liver and necrosis of the rumen and blindness, occur in calves kept on an A-deficient diet after birth and up to six months of age. These could all be prevented by feeding cod-liver oil and other A containing foods, and cures could be effected rapidly and sometimes dramatically. Oedema of the optic papilla is said by Moore (1939) to be demonstrable by the ophthalmoscope in carotene-deficient calves. White spotted kidneys have also been recorded in experimentally produced vitamin A deficiency.

It is important to emphasise that in practice it is not usual to get simple uncomplicated vitamin A deficiency in calves. Various workers have analysed the A content of livers in calves dead from various pathological conditions, and in inflammatory conditions of the bowels, fevered conditions, joint and navel ill, etc., they have recorded abnormally low or nil values. There is some doubt, however, how much the low values may be associated with bacteria and other agents in causing the lesions, and to what extent the disease causes destruction of vitamin A already stored in the liver.

The calf is normally born with a poor A reserve in its liver, but reinforces this rapidly from colostrum, the importance of which has been noted. In late winter and spring, colostrum has a lower content of vitamin A than in summer, autumn and early winter. Spring calves, which show a higher general all-round death rate than others, require special attention paid to vitamin A intakes. The practice of dosing all calves born between mid-winter and early summer with vitamin A concentrates at weekly intervals might be extended with advantage, and the provision of green food, dried carrot meal, lucerne and young grass meal, or other food rich in vitamin A precursor—carotene—should be ensured for calves born at this time rather than for others.

Vitamin D has been mentioned as being supplied through the ultra-violet irradiation effect of sunlight and its importance in relation to mineral intakes has been noted. Rickets in calves will hardly ever occur in well-lighted calf houses or in calves getting adequate amounts of reliable cod-liver oil. Incidentally, well-lighted food store houses may be indirectly useful since the irradiation of foods

by sunlight has been proved to have a strong anti-rachitogenic effect.

Vitamin C has received much attention during recent years.

In man, it has been shown that adequate supplies of C are of the very greatest importance in establishing immunity to various diseases, especially in diphtheria, where ascorbic acid plays a significant role in protection against diphtheria toxin (King and Marten, 1935), pneumococcus infection, rheumatic fever, pulmonary tuberculosis, and in other febrile conditions (McCollum, Orent-Keiles and Day, 1939). Its importance in ruminants is probably much greater than has hitherto been realised. Phillips and others (1941) have lately shown that vitamin C synthesis is closely related to the intake of vitamin A, and it seems likely that in calves, though not necessarily in adult animals, if the A intake is kept up little or no worry need be felt that C will be deficient. If supplies of C are considered necessary in convalescence or illness they can be given either as ascorbic acid injections or in the form of such foods as green fresh grass, swedes, etc., but not silage.

The vitamin B complex consists of several distinct substances. From all accounts it seems that there is little doubt that normal calves, after the purely milk-feeding stage is passed, can synthesise all the members of the B complex which they require. This synthesis is carried on in the rumen by the bacterial flora which are themselves known to need various members of the B complex group before they can flourish.

There are some farms where the calves, although getting good sound foodstuffs, fail to grow normally, show a subnormal appetite between four and seven weeks of age or so, and may become thin and pot-bellied. The stockman describes them as "hanging fire." In due time they usually improve, come to their food better, and ultimately seem to regain most of the condition they lost. Calves in this condition respond very well to the addition of about ½ oz. of bakers' yeast, crumbled into their dry food, or mixed with the gruel after it has been cooked. This is given twice daily. In two or three days they begin to regain their appetite and in a week have started to improve in condition. Yeast contains good quantities of vitamins of the B complex, and the addition of the yeast probably supplies those factors which have been lacking for the proper functioning of the bacteria, and enables them to become well established and to commence their vitamin synthetising duties.

So far as vitamin E is concerned, the final stage in assessing its real importance in the feeding of calves has not yet been reached. It is known that unduly large amounts of cod-liver oil given to rabbits, guinea-pigs, goats and sheep, cause the destruction of vitamin E in the food, and produce myodystrophic lesions in certain skeletal muscles. Calves, however, only show such lesions when excessively large doses are given, and probably their needs for E are lower than those of other animals.

In concluding this summary, it seems desirable to point out that carotene-rich foods fed to the dam during pregnancy—grass, green foods, kale, cabbages, and so on—will ensure that the colostrum contains adequate vitamin A for the calf after birth as well as supplying the needs of the foetus. After colostrum stops, the daily administration of from 1 to 2 oz. of good quality cod-liver oil, kept properly and used fresh, will ensure enough A and D for the calf up to about two and a half to three months of age. If necessary, yeast will supply most of the factors lacking when dry feeding begins. Consequently, it should be possible in practice to ensure a supply of the vitamins without difficulty.

III. From 3 to 6 months

When the first three or four months in the life of a calf are passed, there is less chance of trouble arising afterwards. If good foundations are laid, it is easy to build properly upon them. Given a continuance of the same general principles of good feeding, described earlier, feeding at this stage will present little difficulty. Calves will make good use of a surprisingly large number of varied rations. Cheaper foods are introduced at three to four months according to the type and development of the calves. The new foods must be started gradually. Silage, from 2 or 3 increasing to 5 or 7 lb. daily; sugar beet pulp well soaked; roots, pulped or fingered; green crops, especially good pasturage with a balanced clover content; and a continuation of the best hay available, make up the bulk of the rations. Many owners prefer to continue up to six months with 2 or 3 lb. of the concentrate mixtures used earlier, or with such as can be supplied from home-grown crops only. They may reduce the bulky foods, and feed rather more concentrates if supplies allow. Most, however, try to get the dry mixtures which are expensive cut down as soon as possible for ordinary commercial stock. The feeding of extra vitamin supplements is gradually discontinued, unless in winter when calves are housed, when it is wise to continue them, up to four months. Minerals should not be stopped, however, and attention should be constantly paid to the protein content of the food so that growth will be normally maintained.

The real secret of successful calf-feeding at this stage is to provide as good a variety of different foods as possible. This policy ensures that the growing calf—and it applies to the younger calf, too—will have a reasonable chance of getting all the nutrients it requires. If any one food is deficient in one factor, there is a good chance that another food will contain it. Where only one or two foods are fed, the calf has no chance to make good any deficiency that may be present.

I must try to emphasise what I regard as one of the most generally neglected principles of good husbandry—adequate, regular, out-of-door exercise for all young growing stock which are to be used for breeding and producing purposes later in life. There are not enough exercising yards, small sheltered paddocks, open yards, etc., for the young stock of any species on most farms. Now that electric fencing is satisfactory, there is really no excuse for neglecting to provide the small temporary out-door paddock on clean leys or pasture. It is necessary to have shelter from severe weather, and from autumn onwards yards well littered with wheat straw (which is now a surplus on many farms) are better than paddocks. They avoid the danger of young animals at the susceptible stage of life becoming infested with husk and other parasites. Ringworm is always a menace in winter for indoor housed calves, but it is much less common, indeed very rare, in calves kept in the open air and getting as much sun as there may be.

CONCLUSION

In conclusion, I would like to point out again that, except for a few cases of congenital disease—tuberculosis, etc.—the great majority of calves are born healthy, even at the expense of the dam's system; yet death rates range from 8 to 15, 18, 19, and even 25 per cent. of all living calves born. The great majority of these deaths are due, fundamentally, to errors in feeding and management, and as such are preventable. The infectious diseases, such as white scour, pneumonia, salmonellosis, and so on should be looked upon in much the same way, for outbreaks are intensified under conditions of bad management and poor hygiene. Calf houses and calf pens are only too often the worst and most neglected buildings on the farm, and yet the whole foundations of the herd's future are laid in calfhood. Just a little care and attention, and the giving of good advice to farmers whose conditions are bad and who experience losses among their calves, can produce great and positive improvements.

We have very much still to learn, but at least we have firmer foundations of knowledge now than we had formerly. My last point is that improvement in the health of the calves must start with improvement in the feeding and management of the cows themselves, and will with certainty lead to improvement of the whole herd.

References

Eckles, C. W., Williams, V. M., Wilbur, J. W., Palmer, L. S., and Harshaw, H. M. (1924.) *J. Dairy Sci.* **7.** 421.

Haigh, L. D., Moulton, C. R., and Trowbridge, P. F. (1920.) *Montana Agric. Expt. Stat. Res. Bul.* **38.**

Hart, E. B., Steenbock, H., Humphrey, G. C., and Hulce, R. S. (1924.) *J. biol. Chem.* **62.** 315.

Johnson, P. E., Loosli, J. K., and Maynard, L. A. (1940.) *J. Dairy Sci.* **23.** 553.

Jones, I. R., Eckles, C. W., and Palmer, L. S. (1926.) *Ibid.* **9.** 119.

King, W. A., and Marten, L. L. (1935.) *J. Nutrit.* **10.** 129.

Knoop, C. E., Krauss, W. E., and Washburn, R. G. (1935.) *J. Dairy Sci.* **18.** 337.

McCollum, E. V., Orent-Keiles, E., and Day, H. G. (1939.) The Newer Knowledge of Nutrition. 5th Ed. MacMillan Co., New York.

Mitchell, H. H., and McClure, F. J. (1937.) Bull. nat. Res. Coun., Wash. 99.

Moore, L. A. (1939.) *J. Dairy Sci.* **22.** 803.

Neal, W. M., and Ahmann, C. F. (1937.) *Ibid.* **20.** 741.

Phillips, P. H., Lundquist, M. S., and Boyer, P. D. (1941.) *Ibid.* **24.** 977.

Rusoff, L. L. (1941.) *Florida Agric. Expt. Stat. Tech. Bulls.* 356 and 359.

Savage, E. S., and McCay, C. M. (1942.) *J. Dairy Sci.* **25.** 595.

Schwarz, C. (1925.) *Biochem. Z.* **156.** 130.

Theiler, A. (1934.) *Vet. J.* **90.** 143.

———, Green, H. H., and Dutoit, P. J. (1927.) *J. agric. Sci.* **17.** 291.

Calf Rearing. Min. of Agric. and Fish. Bull. No. 10. 1935.

THE "PEDIGREE" AND "COMMERCIAL" GAP

"A month ago," observes *The Farmers' Weekly* in its issue of February 19th, "we drew attention to the high rate of disease in, and to the deplorable quality of much of our cattle. We invited readers to go into any ordinary market and to consider honestly whether they could be satisfied with the standard of stock offered. On the other hand, a visit to any of the great pedigree sales or a look at the milk records of successful breeders will show what can be done to establish really first-class stock. . . .

"The disparity between the best of our pedigree breeders and the ordinary 'commercial' producer is already far too wide and is growing wider. The very fact that one can use such terms to indicate a difference is a confession. The proper market for our top breeding stock should not be the Argentine or the Antipodes, or even a ravished Europe. It is at home. We should be using here and now far more quality bulls than there are available. Let us hear less about not being able to afford good animals. If overseas buyers can afford them we can. In fact we can't afford not to have them."

CLINICAL COMMUNICATION

Two Cases of Death Due to Parasitic Aneurysms

MYRA L. BINGHAM, C. W. OTTAWAY,
Both of Royal Veterinary College,
AND
M. SENIOR,
Dunstable

Case I

Subject.—Yearling thoroughbred colt.

History.—Purchased together with a two-year-old filly,* half-sister to the colt, some months previous to death, the animal appeared to be normal until Saturday, May 30th, 1942. It had been seen cantering in the paddock at 5 p.m., but at 7 p.m. it was reported to the owner to be ill. He found it very weak and blowing and, although there appeared to be no symptoms of pain, abdominal trouble was suspected and one of us (M. S.) was called at 10 p.m.

Clinical Examination.—The colt was scarcely able to stand. The visible mucous membranes were very pale, almost white. The temperature was 97·5° F. Respirations were laboured and the pulse rate was about 70 p.m., with evidence of a dilated heart. The diagnosis was internal haemorrhage from a ruptured blood vessel and a very guarded prognosis was given. The colt was coaxed into a shed in the paddock and adrenalin and stimulants were administered. Death occurred during the night.

Post-mortem Examination.—The superficial blood vessels contained very little blood. On removal of the intestines an enormous blood clot was seen in the dorsal part of the abdominal cavity. The clot was extra-peritoneal, and was separated only after considerable difficulty, as it extended forward to the liver. The mass removed by dissection included a portion of the liver, the aorta and the right kidney. Strongyles were found in the blood clot. There was a rupture, about 4 cm. long, of the right kidney near its pelvis. An aneurysm was found involving the origin of the right renal artery and several of its intra-renal branches. The arterial walls were severely affected and grossly thickened so that the artery was about twice its normal size. A total of 170 *Strongylus vulgaris* larvae were recovered from the main renal artery and its branches. The aorta and the left renal artery were not affected and no other aneurysms were observed. The heart showed dilatation.

It was concluded that the immediate cause of death was rupture of the right kidney resulting from aneurysm of the renal artery due to invasion by *S. vulgaris* larvae.

Case II

Subject.—Fourteen-year-old bay pony mare.

History.—The pony had been out at grass and nothing abnormal had been noticed until one morning it was found dead in the paddock. It was sent to the Hunt kennels where a *post-mortem* examination was made by one of us (M. S.).

Post-mortem Examination.—The large colon was very inflamed and all but its first portion was studded with petechial haemorrhages, about 1 cm. in size. When the abdominal wall was further incised, about one gallon of pinkish-grey fluid escaped from the abdominal cavity. The mesentery and parts of the small intestine showed areas of inflammation and there was evidence of severe peritonitis. The liver had a yellowish-brown colour and was very friable. The left kidney appeared to be normal. Considerable difficulty, however, was experienced in tracing the right kidney and it later transpired that the huntsman had removed it along with a mass of tissue involving the renal artery (which was affected with an aneurysm), the aorta and a portion of the posterior vena cava. When examined the true kidney tissue was found to be much reduced and only a band, about 4 cm. thick, representing the outline of the greater curvature, remained. The presence of adhesions and fibrous tissue in the area of its pelvis suggested that the kidney had been subjected to great pressure, probably as a result of the aneurysm obstructing the outflow of urine and so leading to a rupture of the renal pelvis. The kidney did not appear to have functioned for a considerable time.

An enlargement, about 5 × 2·5 cm., on the direct colic artery near the pelvic flexure was removed and, on examination, a large rupture of the artery was seen along with an organised blood clot containing many strongyles. The presence of an organised thrombus extending under the peritoneum covering the artery suggested that the vessel ruptured at least ten days before death. Although the peritoneum and temporary clot had prevented extensive haemorrhage some leakage of blood had occurred and probably accounted for the pinkish-grey fluid in the abdomen. The lymphatic glands and vessels along the mesenteric attachment of the small colon appeared to be very enlarged and corded.

The extreme dilatation of the heart which was noted and the liver changes already mentioned indicated great passive venous congestion. Death was probably due to :—

1. Peritonitis and generalised toxaemia consequent upon parasitic invasion of the bowels.
2. Previous rupture of the direct colic artery, with a subsequent breakdown of its temporary walls formed by the organised blood clot.
3. Rupture of the right kidney.

Dissection Findings.—*Direct Colic Artery.*—The " enlargement " at the pelvic flexure was a long-standing rupture of the direct colic artery. On either side of the rupture the artery was 1 to 1·5 cm. in diameter. The wall was only slightly thickened and the size was due mainly to a solid block of thrombus. At the site of the rupture there was a large organised blood clot in which were enmeshed numerous larvae. A total of 154 *Strongylus vulgaris* larvae were recovered from this artery.

Coeliac Axis.—There was an aneurysm affecting the root of the coeliac axis and also the hepatic branch for its entire extra-hepatic length. The hepatic branch was dilated and slightly thickened, its walls being of uniform thickness throughout its length. The splenic and gastric branches were not affected. A total of 33 *S. vulgaris* were removed from the hepatic branch. No larvae were found in the other branches.

Renal Arteries.—Both arteries were affected with aneurysms. The right renal artery was much more dilated than the left, which was practically of normal size. The size of the right artery (about 1 cm. in diameter) was due almost entirely to the dilatation and to a thick block of thrombus. The wall was slightly thickened, and the tunica intima was very roughened. In the right and left renal arteries were found 17 and 4 *S. vulgaris* larvae respectively.

Aorta.—This was not markedly dilated or thickened, but there was definite roughening of the tunica intima. A total of 35 *S. vulgaris* larvae were recovered, particularly from the areas around the origins of the anterior mesenteric artery, right renal artery, and coeliac axis.

Anterior Mesenteric Artery.—Aneurysms involved the root, right branch, middle branch, one of the left branches, and either the origin of the retrograde colic or the first artery of the small colon. (It was impossible to identify which of these two arteries was involved owing to the extent of the lesion.) The outline of the mass was about 12 × 4 cm. The walls of none of the branches were grossly thickened and the size of the mass was mainly due to dilatation and the presence of thrombus. There was very little fibrous tissue. The numbers of *S. vulgaris* larvae found were as follows :- anterior mesenteric root, 7 ; right branch, 56 ; middle branch, 68 ; retrograde colic or first artery of the small colon, 31. No larvae were found in the left branch.

Conclusions

The important points which arise from a study of these two cases are that :—

1. Although death was primarily due to parasitic invasion, the immediate cause of death was rupture of an artery or organ as a result of such an invasion.
2. The involvement of the renal arteries was extensive.
3. Parasitic aneurysms of the renal arteries causing fatal results appear to have been seldom recorded in the literature.
4. Aneurysms of the renal arteries will cause passive venous congestion due to tissue changes within the kidney, whereas in cases where arteries other than the renals are affected there is comparatively little effect on the circulation of blood, either in the area supplied by the affected artery, or in any other area of the body. This may be due either to obstruction of the lumen of the renal artery, which is an end artery, or to generalised pressure on the circulatory or excretory mechanism of the kidney.
5. The degree of parasitic invasion throughout the body is often very considerable before clinical symptoms are observed.

* This filly has also recently died. It had been dosed for worms last summer, after which its condition had greatly improved and an examination of the faeces at this time showed a very low egg count. It died following an acute attack of enteritis and on *post-mortem* examination aneurysms were observed in the renal arteries and aorta, and along the course of some branches of the anterior mesenteric artery.

Weekly Wisdom

" *To set forth the extent of our ignorance regarding any disease, and to show that the current theories regarding its actual nature are imperfect or altogether erroneous, is to perform a real service to pathology.*"—J. M'Fadyean, 1888.

* * * * *

A well-illustrated booklet setting forth the merits of Percheron horses has been issued by the British Percheron Horse Society, whose Secretary is Mr. H. Gordon Smith, Haslemere, Fulbourn, Cambs. The value of the breed as good movers, for regular breeding and for long service receives emphasis by owners of long experience.

ABSTRACTS

[INVESTIGATIONS ON CONTAGIOUS OPHTHALMIA OF SHEEP, WITH SPECIAL ATTENTION TO THE EPIDEMIOLOGY OF INFECTION BY RICKETTSIAE CONJUNCTIVAE. BEVERIDGE, W. I. B. (1942.) *Austral. vet. J.* **18.** 155-164. (15 refs.).]

Contagious ophthalmia is a highly infective disease of sheep, the principal symptoms of which are conjunctivitis, photophobia, lacrimation and keratitis. The disease, which occurs in most countries, is mild, clinical recovery usually occurring within a week. The author confirms that it is due to Rickettsia-like organisms which would not pass filters of the porosity used and which could not be grown artificially. The organism is described as occurring in two phases, one found in the acute disease and the other in carriers which frequently harbour the parasite for more than 200 days. Though carriers do relapse occasionally, in general recovered sheep are fairly resistant to reinfection, there being cross-protection between strains from different parts of Australia. The disease may possibly be transmitted by flies and, owing to the high incidence of carriers, the imperfect immunity and the influx of lambs, it may persist in a close flock indefinitely.

A. W. G.

* * * * *

[TRANSMISSION OF EQUINE INFECTIOUS ANAEMIA BY THE STABLEFLY, STOMOXYS CALCITRANS, THE HORSEFLY, TABANUS SULCIFRONS (MACQUART), AND BY INJECTION OF MINUTE AMOUNTS OF VIRUS. STEIN, C. D., LOTZE, J. C., and MOTT, L. O. (1942.) *Amer. J. vet. Res.* **3.** 183-193. (12 refs.).]

The authors, after giving a review of literature which yields presumptive evidence of the role of biting flies in transmission, report success in transferring the disease twice by horse fly bites and once by stable flies. They further show that the disease is transmissible by intradermal, subcutaneous, intravenous and intracranial routes. Subcutaneously, the disease was transmitted by infected serum diluted 1:1,000 and by alternate puncturing of an infected and normal horse some 21 times with a hypodermic needle. The disease was also transmitted by injection of an emulsion of the mouth-parts of 24 horse flies fed on an infected horse. Virus was maintained in horses infected experimentally with a simple strain of constant virulence and, for transmission, flies fed on diseased horses were carried manually to normal animals.

A. W. G.

REPORT

[ALAN DUKE OF NORTHUMBERLAND MEMORIAL FUND: Ninth Report of the Management Committee.]

The report covers a wide field of sheep diseases and reflects the enterprise of those responsible for the investigational work. Whilst the style is free and the material of an essentially practical nature, meant rather for the consumption of the intelligent layman than the scientist, it is clear that much careful research has been necessary to reach the present state of knowledge.

Helpful advice is given relating to all those conditions now well recognised by the profession. One variant of the so-called pulpy kidney disease is described as " turnip sickness " though its association with that root is less certain than the fact that affected hogs are all in top condition.

Border pining is dealt with at some length. Pastures where this occurred were usually nutritionally poor, especially in Ca and P. Although low in Fe, Cu and Co they are nevertheless far from being deficient in these minerals. The relationship of the intestinal parasitic flora to this condition is still not clear. Parasitic infection is certainly not the whole story.

In experiments with phenothiazine and " mineral " mixtures the best weight increases were obtained in those groups receiving both together. Good results were procured even on farms where there was a known Ca, P and potash deficiency.

Tick control by the use of derris washes was handicapped for some time by the shortage of derris but a valuable substitute has been discovered in the cube root from S. America. In tick-borne fever M & B 693 was found to give good results.

Subscribers to the fund should be well pleased with the progress that is being made.

N. S. B.

QUESTIONS IN PARLIAMENT

MILK (PASTEURISATION)

Mr. PURBRICK asked the Parliamentary Secretary to the Ministry of Food whether he will ensure that no steps are taken towards making the pasteurisation of milk compulsory without consulting the body of opinion of this House?

Mr. MABANE: While I could not give any undertaking in the general terms suggested by my hon. Friend I should welcome whatever opportunity may be afforded to learn the views of the House on this matter.

. . . . .

CATTLE (GRADING SYSTEM)

Mr. BOOTHBY asked the Parliamentary Secretary to the Ministry of Food whether he will examine and, if necessary, revise the present price structure for high-grade beef, with a view to encouraging the production and facilitating the preservation of pedigree stock in Scotland?

THE PARLIAMENTARY SECRETARY TO THE MINISTRY OF FOOD (Mr. MABANE): I would refer my hon. Friend to the second part of the reply which I gave on February 4th to a similar Question asked by my hon. and gallant Friend the Member for Kincardine and Western (Major Thornton-Kemsley).

Mr. BOOTHBY: Is this matter still under consideration by His Majesty's Government, or is it finally closed?

Mr. MABANE: I think the proper answer is that it is finally closed.

. . . . .

BEVERIDGE REPORT (GOVERNMENT'S ATTITUDE)

Mr. DRIBERG asked the Prime Minister how soon the Government will be able to make a further statement of their attitude to the Beveridge Report?

Mr. ATTLEE: It is too soon for the Government to say when they will be able to make a further statement.

Mr. DRIBERG: Will the right hon. Gentleman bear in mind that there is very deep concern and anxiety in the country and the Forces at the Government's apparent surrender to the Prudential? Will he expedite this reconsideration, in view of the promise given by the Lord President of the Council?

Mr. SHINWELL: Do the Government expect to make a statement within the next few months? May we have an answer to the question? Is not this important?

Mr. ATTLEE: I should have thought my answer was quite adequate. I said that the Government were not prepared to make it at the moment. I cannot tie myself down to one or two months.

. . . . .

LAND UTILISATION COMMITTEE, SCOTLAND

Mr. HENDERSON STEWART asked the Secretary of State for Scotland what reasons have now induced him to set up a Land Utilisation Committee in Scotland, in view of the previous refusal to appoint a similar committee so that the Scottish people might be informed about the nature and scope of the land problem in Scotland, in relation to the Report of the Scott Committee for England and Wales?

Mr. JOHNSTON: As my hon. Friend was informed on November 17th last, it was not thought necessary to set up a Land Utlisation Committee on the lines of the committee for England and Wales over which Lord Justice Scott presided. I explained that such an enquiry would duplicate the work of the many Scottish committees already appointed to deal with subjects of vital importance to rural Scotland. I have set up the committee of which Lord Normand is chairman solely to ensure that any recommendations of the English committee, so far as applicable to Scottish conditions, are covered by the work of the Scottish committees I have mentioned, or otherwise.

. . . . .

TANGANYIKA (RINDERPEST CONTROL)

Sir P. HANNON asked the Secretary of State for the Colonies whether he can make a statement on the operations of the rinderpest control in Tanganyika; and whether both schemes to which grants have been made under the Colonial Development and Welfare Act, 1940, are working satisfactorily?

Colonel STANLEY: As a statement on this subject is necessarily rather long, I will, with my hon. Friend's permission, circulate it in the OFFICIAL REPORT. The work, which is being assisted from the Colonial Development and Welfare Vote, is proceeding with generally satisfactory results.

Sir P. HANNON: Could my right hon. and gallant Friend say in just a word whether this disease has been got under in Africa now?

Colonel STANLEY: It is being got under, but it has not yet been completely killed.

Following is the statement:

In 1939 a serious outbreak of rinderpest in Southern Tanganyika threatened an extension of the disease into Northern Rhodesia and Nyasaland and further South. A campaign was undertaken for its suppression by the vaccination of all cattle in Tanganyika to the South of the Central Railway. To afford more permanent security against the spread of the disease Southwards, it was subsequently agreed that all cattle in certain areas should be permanently immunised, and that veterinary control and intelligence services should be maintained throughout Tanganyika. Funds amounting to £64,000 were provided from the Colonial Development and Welfare Vote for this purpose, to cover a period of two years which ended on September 30th, 1942.

These measures were not entirely successful in eliminating the risks, owing to the appearance of rinderpest in game at various points not far from the Northern Rhodesia boundary. It was, therefore, decided to erect a game fence along the Tanganyika/Northern Rhodesia boundary, and to reinforce the fence by patrols and a game-free strip of at least 25 miles in depth on either side of the fence. A part of this further work is also being financed from the Colonial Development and Welfare Vote at a cost of £29 300. At the beginning of this year two further schemes were made under the Act, one for the erection of 50 miles of duplicate fence on the Northern side of the original fence, in place of the 25 mile game-free belt on the Southern side, which would have interfered with an experiment in tsetse fly control in the region of Abercorn. A free grant of £3.000 has been made for this purpose. Another free grant of £4,640 has been made for research into the part played by wild game as reservoirs and carriers of rinderpest. The present operations in Southern Tanganyika afford an exceptional opportunity for research on this subject, of which little has hitherto been known.

The position at the end of 1942 was that although the intelligence service mentioned above had been active, no rinderpest infection has been found in cattle for a considerable time, but infection in game was suspected in the extreme North of the Lake Rukwa area, and possibly further North still. Inoculations of suspected cattle were proceeding steadily, except in one area where action had been held up by an outbreak of East Coast fever. When this area has been dealt with, there will be a solid belt of rinderpest-immune cattle for 200 miles Northwards from the Rhodesia-Tanganyika frontier. Writing on January 9th. 1943, the Director of Veterinary Services in Tanganyika said that at the moment his Department was unable to find any rinderpest infection in either cattle or game in the area lying South of the Central Railway, but both game and cattle areas were under careful and continuous inspection.

A meeting of representatives of the territories concerned was arranged by the Government of Southern Rhodesia to take place in February, 1943, but no report of this conference has yet been received.

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Mar. 24th.—Meeting of the Section of Comparative Medicine, Royal Society of Medicine, at the Society's House, 1, Wimpole Street, W.1, 2.15 for 2.30 p.m.

Mar. 24th.—Meeting of the Derbyshire Division, N.V.M.A., at Sutton Bonington, 2 p.m.

Mar. 24th.—Meeting of the Scottish Branch, N.V.M.A., at Glasgow, 2.30 p.m.

Mar. 26th.—Meeting of the North Wales Division, N.V.M.A., at Rhyl, 2 p.m.

Mar. 27th.—Meeting of the Society of Women Veterinary Surgeons, Friends' House, Euston Road, N.W., 2.30 p.m.

Mar. 27th.—Meeting of the V.V.B.F. Ladies' Guild at 36, Gordon Square, W.C.1, 2.30 p.m.

Mar. 28th.—Meeting of the Dumfries and Galloway Division, N.V.M.A., at Carlisle, 12 noon.

April 2nd.—Annual General Meeting, North of England Division, N.V.M.A., at Newcastle-on-Tyne, 11.30 a.m.

April 8th.—Annual General Meeting of the South-Eastern Division, N.V.M.A., at Maidstone, 2.30 p.m.

April 14th—15th.—**R.C.V.S. Committee and Council Meetings**, Royal Station Hotel, York.

DIRECTOR, ARMY VETERINARY AND REMOUNT SERVICES

Brigadier George Alexander Kelly

Brigadier G. A. Kelly assumed duty as Director, Army Veterinary and Remount Services, War Office, on March 1st, 1943, in succession to Brigadier C. A. Murray, C.B.E. He arrived recently from the Middle East, where he has been head of the Veterinary and Remount Services for the past three years.

Brigadier Kelly qualified at the Dublin Veterinary College in December, 1910, and in the following February was commissioned in the Royal Army Veterinary Corps. Of his 32 years of Army service over 23 years have been spent abroad. In the war of 1914-1918 he served in France with the Indian Expeditionary Force and on the North West Frontier of India. He was mentioned in despatches for services on the North West Frontier of India. In 1935 he was awarded the Brevet rank of Lt.-Colonel.

Early in 1940 he was appointed Deputy Director of Veterinary Services, Palestine, and later was transferred to Middle East Command Headquarters, where, on the amalgamation of the Veterinary and Remount Services, he became Deputy Director of both Services. For distinguished services in this theatre of war he was mentioned in despatches in December, 1942.

He has always been interested in all kinds of sport, particularly racing, cricket and big game shooting, and some of his trophies of big game adorn the walls of the Junior Army and Navy Club.

He had spent many of his years of service with the Remount Department in India and his knowledge of Army animals bred in and imported by India is very extensive.

Brigadier Kelly brings to the War Office a knowledge of the functions of the Veterinary and Remount Service in modern war and with this, and his wide executive and administrative experience, the future of the Corps is in safe and capable hands.

The profession will all wish him success and happiness during his tenure of office.

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TOWELS FOR VETERINARY SURGEONS

We have received from the Ministry of Agriculture and Fisheries the following note relative to the above, supplementary to that published in our last issue:—

1. The Ministry is authorised to issue certificates to enable veterinary surgeons who are engaged in private practice to purchase, without having to surrender clothing coupons, a limited number of towels for use in connection with their professional work. Supplies of towels are, however, extremely short and, therefore, veterinary surgeons are specially asked to postpone their applications for certificates as long as possible. In the first instance, one certificate only (equivalent to four coupons, which are enough for two large towels) will be issued to each applicant. In order, however, to provide for special cases where the need for towels is exceptional, arrangements have been made to issue to veterinary surgeons further certificates of similar coupon value, but, in no instance, will more than two further certificates be issued during 1943 to any one veterinary surgeon.

2. Veterinary surgeons in practice in England and Wales should submit their applications to the Secretary, Ministry of Agriculture and Fisheries, Fernlea Hotel, St. Annes, Lytham St. Annes, Lancs.

3. Every application for a certificate should be made on the veterinary surgeon's headed paper and should be in the following terms:—

"I, ..., a veterinary surgeon engaged in private practice at....., hereby declare that I require for the purpose of my professional work additional towels, and I hereby undertake that any towels which I may be enabled to purchase by the certificate for which I now apply shall be used solely in connection with my professional work.

I have not applied for or obtained any certificates in respect of towels from any other Government department.

Date..... Signed....."

4. Every application for a certificate must be made by the veterinary surgeon who requires the towels. A certificate will not be issued to an employer in respect of towels required by qualified assistants or to a firm of veterinary surgeons in respect of towels required for the use of the partners of that firm.

5. Each certificate must, after having been endorsed by the veterinary surgeon to whom it was issued, be surrendered to the trader who supplies the towels.

EMERGENCY SLAUGHTER: FEES ADMISSIBLE AS SALVAGE EXPENSES

The Farm Livestock Emergency Service is informed by the Ministry of Agriculture, in response to an enquiry on the matter of the recovery of expenses incurred by owners of livestock who have to have injured animals slaughtered following air raids, that slaughtering fees paid by claimants may be admitted by the War Damage Commission as legitimate salvage expenses.

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PERSONAL

Marriage. — McIlwraith — Donaldson. — At St. Columba's Parish Church, Largs, on March 4th, 1943, by the Rev. J. Cochrane, M.A., and the Rev. David B. Baxter, B.D., Lieut. Robert McIlwraith, R.A.M.C., younger son of Mr. and Mrs. Robert McIlwraith, 11, Abbot's Road, Grangemouth, to Margaret McKay, eldest daughter of Captain James Donaldson, M.R.C.V.S., and Mrs. Donaldson, Hill View, West Kilbride.

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THE ROYAL ARMY VETERINARY CORPS

The following is an extract from *The London Gazette* dated March 16th, 1943:—

Regular Army

Maj. J. L. Leigh (10864) retires on ret. pay, Jan. 6th, 1943.

Regular Army Reserve of Officers

Capt. J. C. Taylor (43987) from R.U.Rif., to be Capt., Jan. 6th, 1943, retaining his present seniority.

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PREPARATION OF TUBERCULIN

A recently issued announcement by the Ministry of Agriculture states: "In accordance with the decision announced in April, 1942, to substitute as soon as practicable P.P.D. (Purified Protein Derivative) tuberculin for the heat concentrated tuberculin at present issued from the Ministry's Veterinary Laboratory, Weybridge, arrangements have now been made whereby only P.P.D. tuberculin (mammalian and avian) will be issued as from April 1st next. This change is only one of method in the preparation of the tuberculin which ensures greater constancy of the product and no alteration in the strength of the tuberculin is involved."

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LEGAL NOTES

Cruelty to a Calf: Farmer Imprisoned.—At the Warwick Borough Petty Sessions recently, the magistrates heard a case concerning a calf which was discovered in a pen in the cattle market with its hind feet severed. The defendant, A. H. W. Sparkes, farmer, of Lower Watchbury Farm, Barford, pleaded not guilty to causing unnecessary suffering to the animal by sending it to Warwick Cattle Market and exposing it for sale while in a suffering condition.

An R.S.P.C.A. inspector spoke to finding the calf in the state described, and Mr. A. W. Findlay, veterinary surgeon, of Stratford-on-Avon, stating that gangrene had set in, said he had never come across a more wanton case of cruelty. The inspector stated that the hind feet, severed at the joints, were hanging to the upper part of the leg by a little skin. Both joints were swollen and inflamed. Witness spoke to the auctioneer, and with his permission humanely destroyed the animal. The Bench sent defendant to prison for a month, and, in addition, fined him £25, with £5 12s. 6d. costs, or, in default, one further month's imprisonment. The costs included £3 3s. advocate's fee and £2 2s. veterinary surgeon's fee.

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LACTATION AND NUTRITION

At the fifth scientific meeting of the Scottish Group of the Nutrition Society, held in the Institute of Physiology, the University of Glasgow, on Saturday, February 20th, Professor G. B. Fleming (Glasgow) in the chair, the subject under discussion was "Factors influencing lactation and the nutrition of the infant."

The Chairman stressed the urgency of the problem, pointing out our high infant mortality rate and the high incidence of morbidity due to incorrect feeding. He drew attention to the fact that much progress had been made in studying lactation in the cow and how little serious study had been given to the human side. He thought it strange that natural selection had not produced a higher percentage of good milkers amongst women, particularly when account was taken of the high mortality rate amongst the artificially fed even as late as the middle of last century. He held that a qualitative alteration in the milk was of far less importance than a quantitative deficiency; that it was better for the infant to be nourished by an undernourished mother than artificially fed, provided the quantity of milk available was sufficient. Professor Fleming considered that five main factors influenced milk production, namely, diet, fluid intake, emptying of the breast and frequency of milking, work and nervous influences.

Dr. J. A. B. Smith (Ayr) spoke on "The Effect of Diet on Lactation in Animals." He first mentioned one or two factors other than diet which affect lactation. One of these was the proportion of glandular to connective and fatty tissue in the lactating gland. Unless the gland is fully prepared for milk secretion during pregnancy efficient lactation cannot be expected however adequate the diet may be. With the well formed gland, maximum lactation can only result if the diet is sufficient in energy, protein and vitamins. Owing to an increase in the basal metabolic rate during lactation, the energy of the additional digestible nutrients allowed for milk production must be almost twice as much as the energy in the milk. The protein supply must be of first-class biological value and must be rich in lysine and cystine. At the height of lactation the cow is usually in negative calcium balance, but this has no deleterious effect on the yield or quality of the milk provided the feeding during pregnancy and in later lactation is sufficiently adequate for the calcium stores to be replenished. Milk with maximum vitamin content can only be obtained by a liberal allowance of vitamins in the diet.

Dr. G. H. Bell (Glasgow) described "Hormonal influences on Lactation" and pointed out that preparation for lactation begins early in pregnancy and that oestrin and progesterone were not sufficient in themselves to bring out the full development of the mammary glands—presumably the anterior pituitary as well as the ovaries are involved. During pregnancy lactation may be inhibited by the large amounts of oestrogen in the circulation. After parturition the oestrin secretion ceases and the pituitary hormones can then initiate lactation. Although great progress has been made in an analysis of the endocrine processes concerned, our accumulated knowledge unfortunately mainly indicates how lactation may be stopped!

Other contributors were Professor C. McNeil, Edinburgh, ("Nutritional Defects in Hospital Infants"), Professor J. Hendry, Glasgow ("Extraneous factors influencing satisfactory lactation in women"), Dr. Jean Macintosh, Aberdeen ("Observations on the relative incidence of breast and artificial feeding and their significance"), and Dr. Stanley Graham, Glasgow ("Nutritional Defects in Hospital Infants").

In the discussion which followed Dr. A. B. Anderson (Glasgow) described a case of lactation tetany following 21 months' breast feeding. The serum Ca had fallen to 6·9 mg./100 ml. When lactation was stopped and the patient was given a good diet the tetany ceased. Professor Dryerre (Edinburgh) described the condition of lactation tetany in cows in which there is hypo magnesaemia and contrasted it clinically and chemically with so-called milk fever characterised by low serum Ca. Professor Dryerre raised many other interesting veterinary problems associated with lactation.

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H.M. STATIONERY OFFICE PUBLICATIONS

The undermentioned has been published recently. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office.

	Price net s. d.	*Post free* s. d.
House of Lords Papers and Bills (Session 1942-43):—		
(11). Agriculture (Miscellaneous Provisions) Bill	0 4	0 5

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SUMMER RATIONS FOR LIVESTOCK

It is not intended to make any material change in ration scales for livestock during the summer months, unless a marked deterioration in the supply position occurs. The usual seasonal increase of 50 per cent. over winter rates will be made in basic poultry rations for the four months May to August inclusive, to provide for the feeding of chicks reared for replacement during the spring on the special ration allowances granted for that purpose. Rations for dairy cows will again be limited to relatively high-yielding herds—

those averaging over 1¼ or 2 gallons per cow per day according to month—with some provision for discretionary issues in circumstances similar to those in which such issues were made last summer.—*Ministry of Agriculture.*

CORRESPONDENCE

Letters to the Editor should reach the Office not later than by the first post on Monday morning for insertion in following Saturday's issue.

The views expressed in letters addressed to the Editor represent the personal view of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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THE PROPOSED NEW VETERINARY BILL

Sir,—During the past few months, in the absence of any definite facts, I have gained some impressions and formed some opinions concerning the proposed new Veterinary Bill, which may be of interest to other members who are as much in the dark as I am.*

I suppose the principal object of the Bill is to eliminate quackery. If the object is to rid the country of impostors, will opening the portals of the R.C.V.S. to them, or recognising them in any way, accomplish this? I do not think so. It is rather like the housewife who sweeps the dirt under the carpet. The dirt is certainly out of sight, but it now proceeds to ruin the carpet.

The argument put forward in support of recognising the empiric is that Parliament will not consider any Bill which will deprive a man of his livelihood, and, therefore, if we wish to prohibit (I should say " attempt to prohibit ") further quackery, we must accept the *status quo* of all those who are at present making a living by the treatment of animals. As I see it, any such move would infinitely strengthen the position of those individuals and correspondingly weaken our own. The veterinary surgeon has never stood so high in the estimation of the general public as he does to-day. The people in general are gradually realising that there is a trained body of men, practising a skilled profession, to whom it pays them to turn when they are in doubt about matters veterinary. The quack is on the way out and all that is wanted is something to hasten his exit. That " something " is not recognition. I think it is propaganda (the word is used in its original sense). Much has been done recently on our behalf by the farming periodicals and certain wholesale druggists, and I believe that if the R.C.V.S. started a similar campaign on behalf of its children, emphasising the advisability of seeking *only* professional advice, the extirpation of the charlatan would be in sight.

Finally, I do not think it is possible entirely to eliminate quackery by Act of Parliament, at any rate so far as Veterinary Surgery is concerned. The only sure way of ridding ourselves of this thorn in our flesh is to educate the community to have confidence only in the fully qualified practitioner and to see that we are worthy of that confidence.

Yours faithfully,

7, Miller Street, Hamilton. J. Deans Rankin.

March 5th, 1943.

* A copy of the Draft Veterinary Surgeons Acts (Amendment) Bill and of the Memorandum prepared in connection therewith, has now been issued to every member R.C.V.S. from 18, Victoria Avenue, Harrogate.—*Editor.*

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SULPHONAMIDES IN VETERINARY PRACTICE

Sir,—I read with interest the article by G. N. Gould upon the above subject, which appeared in your issue of February 27th. The author states that " Sulphaguanidine is of no value in the treatment of rabbits with coccidiosis." My information, from more than one source, is that sulphaguanidine is of great value against avian coccidiosis. I would be interested, therefore, to learn from Mr. Gould, or any other reader, in what fundamental way birds differ from rabbits so far as concerns the vulnerability of their intestinal parasites to lethal or inhibitory agents.

The author then makes three very sweeping assertions, *viz.*, that sulphanilamide is a *specific* for strangles, for feline enteritis and for feline distemper. I do not have much opportunity nowadays to practise among horses, but I have made a working-life's study of cats and dogs, and have yet to discover any agent (other than a specific serum) which could be eulogised by the term " specific " in either cat disease. I am aware that some practitioners do not as yet recognise the clear difference between true infectious enteritis and ordinary distemper of the cat, although Mr. Gould appears to do so.

But, personally, I am utterly convinced that the two diseases are separate entities. Therefore, what may be specific for one is not necessarily specific for the other. It is largely a matter of correct diagnosis.

I *do* concede that sulphapyridine (rather than sulphanilamide) has a definite place in the therapeusis of distemper—acting not against the virus but against the secondary infections.

I cannot concede that *any* chemical agent has yet been found which is specific for either distemper or feline enteritis, and I devote my whole time to such questions. There seems a possibility, however, that sulphaguanidine might prove successful in the last named, and I am taking steps to investigate its virtues in this direction. If any practitioner will be so kind as to indicate to me the name of any drug which, in his experience, has definitely proved itself as a specific against true feline enteritis, I will be exceedingly grateful.

So far as strangles is concerned, if sulphanilamide is a specific as Gould states it is, why does he still have to contend with abscesses. Do not the latter appear at a late stage? And if—as he states—he has to treat the disease in the ordinary way, how can the remedy be elevated to the dignity of a specific, and how can he get affected horses back to work in 14 days?

This is not intended as destructive criticism, but as a quest for information which must undoubtedly interest a great number of readers.

Mr. Gould stated that sulphadiazine is the newest, least toxic and most active of the sulphonamides. I challenge all three statements on the authority of the manufacturers.

This letter is forwarded with the sole object of preventing any misconception regarding the actions and uses of new chemotherapeutics, a subject which, as Gould rightly states, has caused " endless confusion " because of the complexity of names and chemical formulae.

Yet we must not permit ourselves to be stampeded into hurried and erroneous beliefs that this or that is a specific for one or the other pathological condition, without first giving full and lengthy trial and observation and recorded results of their use in the field.

Yours faithfully,

658, Finchley Road, N.W.11 Hamilton Kirk.

March 4th, 1943.

A big post-war demand from abroad for horses was predicted by Professor J. R. M'Call, M.R.C.V.S., at the annual meeting in Glasgow of the Clydesdale Horse Society. He urged members to continue breeding so far as possible with a view to meeting anticipated conditions in devastated areas.

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Messrs. J. Bibby & Sons, oilcake manufacturers, of Liverpool, have made a gift of £250 to the University of Liverpool Veterinary School.

DISEASES OF ANIMALS ACTS, 1894 TO 1937, AND AGRICULTURE ACT, 1937 (PART IV).

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Parasitic Mange*	Sheep Scab	Swine Fever
Feb. 1st to 15th, 1943 ...	18	—	2	23	22
Corresponding period in—					
1942 ...	16	3	5	15	19
1941 ...	22	20	2	18	127
1940 ...	26	2	2	13	185
Total Jan. 1st to Feb. 15, 1943	46	8	2	51	63
Corresponding period in—					
1942 ...	46	3	8	62	61
1941 ...	74	71	4	63	377
1940 ...	81	7	7	49	527

Note.—The figures for the current year are approximate only.
* Excluding outbreaks in Army Horses.